

IN THE CLAIMS

1. (Previously Amended) A prosthesis adapted for implantation against a resected surface on a proximal end of a femur and inside of an intramedullary cavity of the femur, the prosthesis comprising:

a femoral head component comprising an external bearing surface; and

a femoral stem component comprising:

a neck portion comprising a proximal portion, engagable with the femoral head component, and a distal neck body;

a flange portion distal and adjacent to the neck portion, the flange portion comprising a bottom surface;

a transitional body region adjacent to the bottom surface of the flange portion and extending from the distal neck body; and

an elongated stem portion extending distally from the transitional body region and having a longitudinal axis oriented at an acute angle from the bottom surface of the flange portion;

wherein the transitional body region is shaped to flex such that, during a normal gait cycle, the bottom surface exerts a significant compressive load on the resected surface of the femur.

2. (Original) A prosthesis as is claim 1, wherein the elongated stem portion comprises a uniform envelope with a substantially constant cross-sectional peripheral shape and size.

3. (Previously Amended) A prosthesis as in claim 1, wherein the elongated stem portion comprises a proximal section having a cross sectional shape that is substantially consistent along a longitudinal length of the proximal section, wherein a minimum displacement between the bottom surface of the flange and the proximal section, measured normal to the bottom surface, is less than thirteen millimeters.

4. (Original) A prosthesis as in claim 1, further comprising a rotation-restricting boss, extending from the bottom of the flange portion.
5. (Original) A prosthesis as in claim 2, further comprising a rotation-restricting boss, extending from the bottom of the flange portion.
6. (Previously Amended) A prosthesis as in claim 5, wherein the rotation restricting boss has an axis of protrusion with a boss axis origin near the bottom surface of the flange, the elongated stem also has a stem axis origin near the bottom of the flange, the boss axis origin and the stem axis origin are spaced apart by a length more than the maximum cross-section of the elongated stem portion.
7. (Original) A prosthesis as in claim 6, wherein the axis of protrusion and the longitudinal axis are substantially parallel.
8. (Original) A prosthesis as in claim 6, wherein the axis of protrusion and the longitudinal axis are not substantially parallel.
9. (Previously Amended) A prosthesis as in claim 6, wherein the axis of protrusion is normal to the bottom surface of the flange portion.
10. (Previously Amended) A prosthesis as in claim 1, wherein the elongated stem portion has a distal section with multiple longitudinal flutes, wherein the longitudinal flutes are aligned approximately parallel to the longitudinal axis.
11. (Cancelled)
12. (Previously Amended) A prosthesis as in claim 1, wherein the neck portion is aligned at an obtuse angle with respect to the bottom surface of the flange portion.

13. (Previously Amended) A prosthesis as in claim 12, wherein the obtuse angle is between 100° and 170°.
14. (Previously Amended) A prosthesis as in claim 1, wherein the neck portion has a first end and a second end, wherein the first end is connected to the flange portion and extends proximally therefrom and the second end is shaped to press-fit into the femoral head component.
15. (Previously Amended) A prosthesis as in claim 14, wherein at least a portion of the outer surface of the femoral head component is hemispherical.
16. (Previously Amended) A prosthesis as in claim 1, wherein the acute angle ranges from 15° to 80°.
17. (Previously Amended) A prosthesis as in claim 2, wherein the uniform envelope has a maximum cross-section area measured on a plane perpendicular to the longitudinal axis.
18. (Previously Amended) A prosthesis as in claim 1, wherein the elongated stem portion has a length of at least one hundred millimeters as measured along the length of its longitudinal axis.
19. (Cancelled)
20. (Previously Amended) A prosthesis as in claim 1, wherein the elongated stem portion comprises a tapered portion.
- 21-42. (Cancelled)

43. (Previously Added) A prosthesis as in claim 1, wherein the elongated stem portion comprises a proximal section having a cross sectional shape that is substantially consistent along a longitudinal length of the proximal section, wherein a minimum displacement between the bottom surface of the flange and the proximal section, measured normal to the bottom surface, is less than a maximum cross sectional width of the elongated stem portion, measured perpendicular to the longitudinal axis.

44. (Previously Added) A prosthesis as in claim 1, wherein the transitional body region is shaped to provide a lateral offset between an axis of the neck portion and the longitudinal axis of the elongated stem portion.

45-57. (Cancelled)